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| EXAMINER |
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| ART UNIT | PAPER NUMBER |
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DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09-458,875

Applicant(s)

Kelle

Examiner

George Gendreau

Group Art Unit

1763

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 12-10-99 (12-10-99 paper #1)
- ☐ This action is **FINAL**.
- Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-26 is/are pending in the application.
- Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-26 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement.

Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
 - ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
 - ☐ received in Application No. (Series Code/Serial Number)
 - ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).

*Certified copies not received:

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s).
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other

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15. Claims 19-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The wording used in claim 19 is confusing, and should be rewritten.

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1-11, 19, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amini et. al. (5,030,590).

Amini et. al. disclose a two step plasma etching process for forming polysi gates on a wafer which is comprised of the following steps. First, the polysi layer is anisotropically etched in a plasma comprised of (Cl₂-HBr) using a patterned photo resist etch mask. Second, the polysi is anisotropically over etched in a plasma comprised of (Cl₂-HBr-He-O₂). Third, an etch residue produced on the sidewalls of the polysi gates (i.e.-polysi stringers) is wet stripped from the polysi gates. This is discussed specifically in columns 3-4; and discussed in general in columns 1-6. Amini et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

-the specific etch process parameters which are claimed by the applicant; and

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-the specific usage of a parallel plate, rie etcher with power applied to both the anode, and the cathode to conduct the etching process

It would have been obvious to one skilled in the art to employ a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process in the process taught above based upon the following. The usage of parallel plate rie etchers with power applied to both the anode, and the cathode to conduct a plasma etching process is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, the specific usage of a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process taught above simply involves the usage of an alternative, and at least equivalent means for conducting the plasma etching process to those means which are specifically taught.

It would have been prima facie obvious to employ any of a variety of different process parameters in the plasma etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process parameters which are claimed by the applicant based upon In re Aller as cited below.

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"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

18. Claims 1-11, 19, and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartzman et. al. (4,818,334).

Swartzman et. al. disclose a two step plasma etching process for patterning polysi runners on a wafer which is comprised of the following steps. First, the polysi runners are anisotropically etched in a plasma comprised of (Cl₂-N₂-CHCl₃) using a patterned photo resist etch mask. Second, the etch residue left on the sidewalls of the polysi runners (i.e.-polysi stringers) are stripped (i.e.-etched) from the sidewalls of the polysi runners using a plasma comprised of (CO₂-He-Cl₂). This is discussed specifically in columns 3-4; and discussed in general in columns 1-6. Shwartzman et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

- the isotropic stripping of the etch residues from the sidewalls of the etched structure during the second etching step;
- the specific etch process parameters which are claimed by the applicant; and

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-the specific usage of a parallel plate, rie etcher with power applied to both the anode, and the cathode to conduct the etch process

It would have been obvious to one skilled in the art to employ a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process in the process taught above based upon the following. The usage of parallel plate rie etchers with power applied to both the anode, and the cathode to conduct a plasma etching process is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, the specific usage of a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process taught above simply involves the usage of an alternative, and at least equivalent means for conducting the plasma etching process to those means which are specifically taught.

It would have been obvious to one skilled in the art to conduct the second etching step in the process taught above which is used to remove etch residues left on the sidewalls of the etched structure from the first etch step as an isotropic etching step based upon the following. It is conventional or at least well known in the semiconductor processing art to conduct a plasma etching step used to remove etch residues left on the sidewalls of a previously plasma etched structure by conducting an isotropic etching plasma etching step. (The examiner takes official notice in this regard.) Further, it would have been desirable to use an isotropic plasma cleaning step in the process taught above in order to ensure that the plasma is able to make good contact

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with the sidewalls of the etched structure so that the etched structure is cleaned in the most efficient manner possible.

It would have been prima facie obvious to employ any of a variety of different process parameters in the plasma etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process parameters which are claimed by the applicant based upon In re Aller as cited below.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

19. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rizzuto (6,001,688).

Rizzuto disclose a two step plasma etching process for patterning polysi runners on the surface of a wafer which is comprised of the following steps. First, the polysi layer is

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anisotropically etched in a plasma comprised of (HBr-O₂). Second, the etch residue left on the sidewalls of the polysilicon runners (i.e. - the polysilicon stringers) is stripped (i.e. -etched) from the sidewalls of the polysilicon runners using a plasma comprised of (SF₆ or CF₄) plus O₂. This is discussed specifically in columns 4-8; and discussed in general in columns 1-10. This is shown specifically in figures 8-9; and shown in general in figures 1-9. Rizzuto fails, however, to specifically disclose the following aspects of applicant's claimed invention:

- the specific usage of He as a diluent in the plasma etchants employed in each plasma etching step;
- the isotropic stripping of the etch residues from the sidewalls of the etched structure during the second etching step;
- the specific etch process parameters which are claimed by the applicant; and
- the specific usage of a parallel plate, etcher to which power is applied to both the anode, and the cathode to conduct the etch process

It would have been obvious to one skilled in the art to employ He as a diluent in any of the plasma etchants employed in the process taught above based upon the following. The usage of an inert gas such as He as a diluent in a plasma etchant is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, the usage of a plasma etchant which contains an inert gas diluent such as He to conduct the plasma etching process taught above simply involves the usage of an alternative, and at least equivalent means for

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providing a plasma etchant to those means which are specifically employed in the process taught above.

It would have been obvious to one skilled in the art to employ a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process in the process taught above based upon the following. The usage of parallel plate rie etchers with power applied to both the anode, and the cathode to conduct a plasma etching process is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, the specific usage of a parallel plate rie etcher with power applied to both the anode, and the cathode to conduct the plasma etching process taught above simply involves the usage of an alternative, and at least equivalent means for conducting the plasma etching process to those means which are specifically taught.

It would have been obvious to one skilled in the art to conduct the second etching step in the process taught above which is used to remove etch residues left on the sidewalls of the etched structure from the first etch step as an isotropic etching step based upon the following. It is conventional or at least well known in the semiconductor processing art to conduct a plasma etching step used to remove etch residues left on the sidewalls of a previously plasma etched structure by conducting an isotropic etching plasma etching step. (The examiner takes official notice in this regard.) Further, it would have been desirable to use an isotropic plasma cleaning step in the process taught above in order to ensure that the plasma is able to make good contact

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with the sidewalls of the etched structure so that the etched structure is cleaned in the most efficient manner possible.

It would have been prima facie obvious to employ any of a variety of different process parameters in the plasma etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process parameters which are claimed by the applicant based upon In re Aller as cited below.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

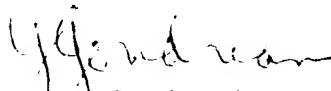
20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -308-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.


George A. Goudreau/gag

Examiner AU 1763